


Korean affricates and consonant-tone interaction

Seunghun Julio Lee (Central Connecticut State University)
Jeremy Perkins (Rutgers University)

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Introduction

- We propose an analysis of consonant-tone interaction for Korean affricates based on Lee (2008)
- [continuant] specifications are unordered in the phonological representation of affricates (Lombardi 1990)

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Laryngeal contrasts in Korean obstruents

(1)	affricates		stops	
a. <i>lax</i>	[ʈ am]	'sleep'	cf. [tal]	'moon' L
b. <i>tense</i>	[ʈʰ am]	'a moment'	cf. [tʰal]	'daughter' H
c. <i>aspirated</i>	[ʈʰ am]	'very'	cf. [tʰal]	'mask' H

(2)	affricates		fricatives	
a. <i>lax</i>	[ʈ am]	'sleep'	N/A	L
b. <i>tense</i>	[ʈʰ am]	'a moment'	cf. [sʰada]	'to be cheap' H
c. <i>aspirated</i>	[ʈʰ am]	'very'	cf. [sada]	'to buy' H

- The place of articulation is represented following Kim (1999).

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Our proposal

- The distribution of Korean affricates supports Lombardi's (1990) proposal that the continuant specifications for affricates do not have to be ordered as [-continuant] preceding [+continuant].
- Cf. Sagey (1986)
[-continuant] precedes [+continuant]

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Analysis - Overview

- We will derive the consonant-tone interaction regarding affricates via constraint interaction.
- Adopting Lee (2008), tones can directly associate with consonants.
 - Such a direct association of tone is only restricted by markedness constraints.
 - There are no faithfulness constraints that preserve tones directly associated to consonants.
 - As a result, tones cannot be contrastive on consonants, but tones on adjacent vowels can be affected by consonants.

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Phonological representation

- Phonologically, affricates can be represented
 - either as unordered [-continuant] and [+continuant] (Lombardi 1990)
 - or as ordered so that [-continuant] precedes [+continuant] (Sagey 1986)

Lombardi 1990: 381	Sagey 1986: 96
[-continuant] Root [+continuant]	Root / \ [-continuant] [+continuant]

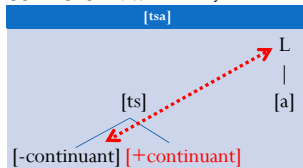
- Cf. Affricates as strident stops (Jakobson, Fant & Halle 1951: 24)

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Ordered [continuant] specifications

- If the ordering of the [continuant] specifications were to play a crucial role, we expect that the [+continuant] feature would affect the pitch of the vowel following affricates since it is closer to the vowel.

→ Then, affricates would pattern on par with fricatives (see [s] and [s*] in (2)), contrary to fact.



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Methods & Results

Emerging tone in Standard Korean

Silva (2006: 305)

“... standard Korean is coming into alignment with other varieties of the language (most of which employ either lexical or phrasal pitch accent), as well as with other East Asian languages, which use F0 in phonemically relevant ways.”

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Methods

- Native speakers of Seoul Korean
- List of words beginning with obstruents varying in terms of place of articulation and manner of articulation
- Recorded in a carrier phrase at the Phonetics Lab of Rutgers University

이건 ___ 이라고 하지요.
“This is called ____.”

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Effects of affricates on pitch

- Lax affricates have lower pitch on following vowels.
- Tense and aspirated affricates have higher pitch on following vowels.

(3)		Initial F0	st.err.
a. lax	[tsa]	193.2 Hz	9.0
b. tense	[ts*a]	297.3 Hz	15.4
c. aspirated	[ts ^h a]	337.1 Hz	14.2

- This is the same pattern seen in stops (Silva 2006, Wright 2007).

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Phonetics of affricates

- Table (3) shows that Korean affricates pattern as stops.
- Affricates and stops share the feature [-continuant].
(cf. affricates and fricatives share the feature [+continuant])
- Phonetically, affricates consist of a stop closure followed by fricative release.
 - This stop closure works in concert with laryngeal activity, and so segments with [-continuant] are better anchors for tone (Cf. Steriade 1994).

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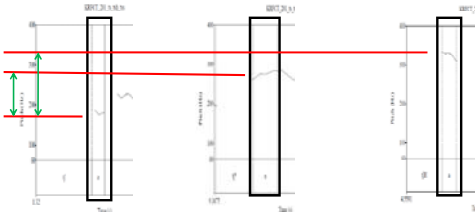
Affricates and Pitch

LAX

TENSE

ASPIRATED

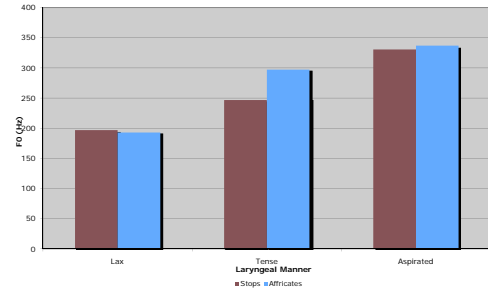
a. [tsa] (mean = 193.2 Hz) b. [ts^aa] (mean = 297.3 Hz) c. [ts^ba] (mean = 337.1 Hz)



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Similar behaviors of stops and affricates

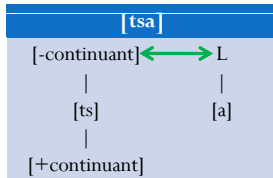
Initial F0 for Stops & Affricates - Speaker 201



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Unordered [continuant] specifications

- As shown in (3), affricates' influence on the pitch of the following vowel comes from the laryngeal feature associated with stops
- Thus, the continuant specifications should not be ordered.



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Unordered [continuant] specifications

- L tone and [-continuant]



- Stops are [-continuant], and therefore occur with L tone.
- Fricatives are [+continuant], and therefore do NOT occur with L tone.

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Unordered [continuant] specifications

The consonant-tone interaction data favors Lombardi's (1990) proposal that the [continuant] specifications of affricates are not ordered in the phonological representation.

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An OT Analysis

Consonants on tone

- Lee (2008)
 - A direct association of tone is only restricted by markedness constraints.

MORA→T

moras not linked to a tone are marked.

ROOTNODE→T

root nodes (including non-moraic consonants) not linked to a tone are marked.

*[+SPREADGLOTTIS]/L

[+s.g] segments associated with L tone are marked.

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Tone is not contrastive on consonants

- Lee (2008)
 - There are no faithfulness constraints that preserve tone directly associated to consonants.

→ This means that no language has tones that are contrastive on consonants.

Unattested language	
H [b a]	L [b a]

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Descriptive OT Generalizations

- Lax affricates do not occur with H tone (4a). This requirement is accommodated by changing H to L tone.
- Tense and aspirated affricates do not occur with L tone (4b, c). This requirement is accommodated by changing L to H tone.

(4)	affricates	
a. <i>lax</i>	[tsam]	'sleep' L
b. <i>tense</i>	[ts [*] am]	'a moment' H
c. <i>aspirated</i>	[ts ^h am]	'very' H

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Analysis – optimal output

- This mapping is optimal.

input		optimal output
L /ts ^h a/	→	H ^ [ts ^h a]

- This does not violate the constraints, *[+SPREADGLOTTIS]/L and ROOTNODE→T
- It does violate IDENT-T; however, this constraint is ranked below the others

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Analysis (cont'd)

- This mapping is not optimal because the aspirated affricate [ts^h] is associated with a L tone.

input		unintended output
L /ts ^h a/	→	L ^ [ts ^h a]

- This violates the constraint, *[+SPREADGLOTTIS]/L

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Analysis (cont'd)

- This mapping is not optimal because the aspirated affricate [ts^h] is not associated with any tone

input		unintended output
L /ts ^h a/	→	L [ts ^h a]

- This violates the constraint, ROOTNODE→T

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Theoretical consequences

- Markedness constraints on consonant-tone interaction outranks the tonal faithfulness constraint (IDENT-T). Under this ranking, the change of tone is allowed to satisfy the markedness requirements.
- In this analysis, consonant-tone interaction results from constraint interaction, and not from representational requirements (i.e. Bradshaw 1999 among others).
- In addition to *[+SPREAD GLOTTIS]/L, the constraint *[+VOICE]/H, *[+CONSTRUCTED GLOTTIS]/L are also active in Standard Korean.
→ Thus, this analysis also accounts for the presence of L tone on lax affricates and H tone on tense affricates.

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Conclusion

- We have proposed an OT analysis of consonant-tone interaction for Korean affricates based on Lee (2008)
- [continuant] specifications are unordered in the phonological representation of affricates (Lombardi 1990).
- Korean affricates behave like stops (rather than fricatives).

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Appendix 1a: Tableau (lax affricates)

	L /ts a/	ROOTNODE→T	*[+VOICE]/H	IDENT-T
a.	L [ts a]			*
b.	H [ts a]	W *		L
c.	H [ts a]		W *	L

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Appendix 1b: Tableau (tense affricates)

	L /ts* a/	ROOTNODE→T	*[+CONSTRUCTED GLOTTIS]/L	IDENT-T
a.	H [ts* a]			*
b.	L [ts* a]	W *		L
c.	L [ts* a]		W *	L

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Appendix 1c: Tableau (aspirated affricates)

	L /ts ^h a/	ROOTNODE→T	*[+SPREAD GLOTTIS]/L	IDENT-T
a.	H [ts ^h a]			*
b.	L [ts ^h a]	W *		L
c.	L [ts ^h a]		W *	L

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